IN THE CLAIMS

This listing shows the current status of all claims, and replaces all earlier versions and listings.

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1. (Currently Amended) A method of interpolating a first set of discrete sample values to generate a second set of discrete sample values using one of a plurality of interpolation kernels, wherein ~~said~~ <u>the</u> interpolation kernel is selected depending on an edge strength indicator, an edge direction indicator and a local contrast indicator for each of ~~said~~ <u>the</u> discrete sample values of ~~said~~ <u>the</u> first set.

2. (Currently Amended) The method according to claim 1, wherein ~~said~~ <u>the plurality of</u> interpolation kernel<u>s</u> ~~is~~ <u>are each derived from</u> a universal interpolation kernel, *h(s)*.

3. (Currently Amended) The method according to claim ~~2~~<u>1</u>, wherein ~~said universal interpolation kernel, *h(s)*, is of the form~~ <u>the plurality of kernels are given by</u>:

$$\underline{h(s_x, s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\right)_{c=0.5} \cdot h\left((2\theta/\pi)s_x + (2\theta/\pi - 1)s_y)w(\theta)\right)_{c=0}\right\}}$$

$$\underline{h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((1-2\theta/\pi - 1)s_x + (2\theta/\pi - 2)s_y\right)_{c=0.5} \cdot h\left((2\theta/\pi - 2)s_x + (1-2\theta/\pi)s_y)w(\theta)\right)_{c=0}\right\},}$$

<u>and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and · indicates matrix</u>

multiplication

$$\cancel{h(s)=}\begin{cases} 1, & 0 \le |s| \le d \\ (2-\frac{3}{2}b-c)\left|\frac{s-d}{1-2d}\right|^3 + (-3+2b+c)\left|\frac{s-d}{1-2d}\right|^2 + (1-\frac{1}{3}b), & d < |s| \le 1-d \\ \cancel{0, \ 1-d < |s| \le 1+d} & \\ (-\frac{1}{6}b-c)\left|\frac{s-3d}{1-2d}\right|^3 + (b+5c)\left|\frac{s-3d}{1-2d}\right|^2 + (-2b-8c)\left|\frac{s-3d}{1-2d}\right| + (\frac{4}{3}b+4c), & 1+d < |s| \le 2-d \\ 0, & Otherwise \end{cases}$$

~~and wherein $s = t / \Delta t$ and $0 \le d < 0.5$~~.

4. (Currently Amended) The method according to claim 1, wherein ~~said~~ <u>the</u> plurality of kernels are given by:

$$h(s)=\begin{cases} (2-\frac{3}{2}b-c)|s|^3 + (-3+2b+c)|s|^2 + (1-\frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b-c)|s|^3 + (b+5c)|s|^2 + (-2b-8c)|s| + (\frac{4}{3}b+4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s)=\begin{cases} 1, & -d < |s| \le d \\ 0, & (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, & \end{cases}$$

$$h(s_x, s_y)_{\theta=o} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein h(s) is a modified cubic kernel, $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and . indicates matrix multiplication.

5. (Currently Amended) The method according to claim 1, wherein ~~said~~ the first set of discrete sample values are at a different resolution to ~~said~~ the second set of discrete sample values.

6. (Currently Amended) The method according to claim 1, wherein the local contrast indicator is used to indicate a text region ~~A method of interpolating a first set of discrete sample values to generate a second set of discrete sample values using an interpolation kernel, characterised in that said interpolation kernel is selected depending on an edge strength indicator, an edge direction indicator and an edge context indicator for each discrete sample value of said first set~~.

7. (Currently Amended) The method according to claim ~~6~~1, wherein ~~said interpolation kernel is a universal interpolation kernel, *h(s)*~~ one or more of the indicators are processed using a morphological process.

8. (Currently Amended) The method according to claim ~~7~~1, wherein the selection of the interpolation kernel is performed using a kernel selection map processed in accordance with a morphological process ~~said universal interpolation kernel, *h(s)*, is of the form~~:

$$\cancel{h(s)=}\begin{cases} 1, & 0 \le |s| \le d \\ (2-\frac{3}{2}b-c)\left|\frac{s-d}{1-2d}\right|^3 + (-3+2b+c)\left|\frac{s-d}{1-2d}\right|^2 + (1-\frac{1}{3}b), & d < |s| \le 1-d \\ \cancel{0, \quad 1-d < |s| \le 1+d} \\ (-\frac{1}{6}b-c)\left|\frac{s-3d}{1-2d}\right|^3 + (b+5c)\left|\frac{s-3d}{1-2d}\right|^2 + (-2b-8c)\left|\frac{s-3d}{1-2d}\right| + (\frac{4}{3}b+4c), & 1+d < |s| \le 2-d \\ 0, & Otherwise \end{cases}$$

~~and wherein $s = t/\Delta t$ and $0 \le d < 0.5$~~.

9. (Cancelled)

10. (Currently Amended) A method of interpolating image data, said method comprising the steps of:

accessing a first set of discrete sample values of ~~said~~ the image data;

calculating kernel values for each of ~~said~~ the discrete sample values using one of a plurality of kernels depending upon an edge orientation indicator, an edge strength indicator, and a local contrast indicator for each of ~~said~~ the discrete sample values; and

convolving ~~said~~ the kernel values with ~~said~~ the discrete sample values to provide a second set of discrete sample values.

11. (Currently Amended) The method according to claim 10, wherein ~~said kernel is~~ the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

12. (Currently Amended) The method according to claim ~~11~~10, wherein ~~said universal interpolation kernel, *h(s)*, is of the form~~ the plurality of kernels are given by:

$$h(s_x, s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h((1-2\theta/\pi)s_x + (2\theta/\pi)s_y)_{c=0.5} \cdot h(((2\theta/\pi)s_x + (2\theta/\pi - 1)s_y)w(\theta))_{c=0}\right\}$$

$$h(s_x, s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\left((2\theta/\pi - 1)s_x + (2\theta/\pi - 2)s_y\right)_{c=0.5} \cdot h(((2\theta/\pi - 2)s_x + (1-2\theta/\pi)s_y)w(\theta))_{c=0}\right\},$$

and wherein h(s) is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix multiplication

$$\cancel{h(s)=}\begin{cases} 1, & 0 \le |s| \le d \\ (2-\frac{3}{2}b-c)\left|\frac{s-d}{1-2d}\right|^3 + (-3+2b+c)\left|\frac{s-d}{1-2d}\right|^2 + (1-\frac{1}{3}b), & d < |s| \le 1-d \\ \cancel{0,} & \cancel{1-d < |s| \le 1+d} \\ (-\frac{1}{6}b-c)\left|\frac{s-3d}{1-2d}\right|^3 + (b+5c)\left|\frac{s-3d}{1-2d}\right|^2 + (-2b-8c)\left|\frac{s-3d}{1-2d}\right| + (\frac{4}{3}b+4c), & 1+d < |s| \le 2-d \\ 0, & Otherwise \end{cases}$$

~~and wherein $s = t / \Delta t$ and $0 \le d < 0.5$~~.

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13. (Currently Amended) The method according to claim 10, wherein ~~said~~ the plurality of kernels ~~are~~ given by:

$$h(s) = \begin{cases} (2-\frac{3}{2}b-c)|s|^3 + (-3+2b+c)|s|^2 + (1-\frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b-c)|s|^3 + (b+5c)|s|^2 + (-2b-8c)|s| + (\frac{4}{3}b+4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, \end{cases}$$

$$h(s_x, s_y)_{\theta=0} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right.$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein h(s) is a modified cubic kernel, $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and . indicates matrix multiplication.

14. (Currently Amended) The method according to claim 10, wherein ~~said~~ the first set of discrete sample values are at a different resolution to ~~said~~ the second set of discrete sample values.

15. (Currently Amended) An apparatus for interpolating image data, said apparatus comprising:

means for accessing a first set of discrete sample values of ~~said~~ the image data;

calculator means for calculating kernel values for each of ~~said~~ the discrete sample values using one of a plurality of kernels depending upon an edge orientation indicator, an edge strength indicator, and a local contrast indicator for each of ~~said~~ the discrete sample values; and

convolution means for convolving ~~said~~ the kernel values with ~~said~~ the discrete sample values to provide a second set of discrete sample values.

16. (Currently Amended) The apparatus according to claim 15, wherein ~~said kernel is~~ the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

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17. (Currently Amended) The apparatus according to claim ~~16~~ 15, wherein ~~said universal interpolation kernel, *h(s)*, is of the form~~ the plurality of kernels are given by:

$$\underline{h(s_x,s_y)_{0\le\theta\le\pi/2} = \frac{1}{\sqrt{2}}\left\{h\Big((1-2\theta/\pi)s_x + (2\theta/\pi)s_y\Big)_{c=0.5}\cdot h\Big(((2\theta/\pi)s_x + 2\theta/\pi - 1)s_y)w(\theta)\Big)_{c=0}\right\}}$$

$$\underline{h(s_x,s_y)_{\pi/2<\theta<\pi} = \frac{1}{\sqrt{2}}\left\{h\Big((2\theta/\pi-1)s_x + (2\theta/\pi-2)s_y\Big)_{c=0.5}\cdot h\Big(((2\theta/\pi-2)s_x + (1-2\theta/\pi)s_y)w(\theta)\Big)_{c=0}\right\}}$$

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta$ x and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and $\cdot$ indicates matrix multiplication

$$
\cancel{h(s)} = \begin{cases} 1, & 0 \le |s| \le d \\ (2 - \frac{3}{2}b - c)\left|\frac{s-d}{1-2d}\right|^3 + (-3 + 2b + c)\left|\frac{s-d}{1-2d}\right|^2 + (1 - \frac{1}{3}b), & d < |s| \le 1-d \\ \cancel{0, \quad 1-d < |s| \le 1+d} \\ (-\frac{1}{6}b - c)\left|\frac{s-3d}{1-2d}\right|^3 + (b + 5c)\left|\frac{s-3d}{1-2d}\right|^2 + (-2b - 8c)\left|\frac{s-3d}{1-2d}\right| + (\frac{4}{3}b + 4c), & 1+d < |s| \le 2-d \\ 0, & Otherwise \end{cases}
$$

~~and wherein $s = t / \Delta t$ and $0 \le d < 0.5$~~.

18. (Currently Amended) The apparatus according to claim 15, wherein ~~said~~ the plurality of kernels are given by:

$$
h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}
$$

.

$$
h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, \end{cases}
$$

$$
h(s_x, s_y)_{\theta=o} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}
$$

$$
h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right.
$$

$$
h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}
$$

$$
h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},
$$

and wherein <u>*h(s)* is a modified cubic kernel,</u> $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and · indicates matrix multiplication.

19. (Currently Amended) The method according to claim 15, wherein ~~said~~ <u>the</u> first set of discrete sample values are at a different resolution to ~~said~~ <u>the</u> second set of discrete sample values.

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20. (Currently Amended) A computer readable medium for storing a program for an apparatus which processes data, said processing comprising a method of interpolating image data, said program comprising:

code for accessing a first set of discrete sample values of ~~said~~ <u>the</u> image data;

code for calculating kernel values for each of ~~said~~ <u>the</u> discrete sample values using one of a plurality of kernels depending upon an edge orientation indicator, an edge strength indicator, and a local contrast indicator for each of ~~said~~ <u>the</u> discrete sample values of ~~said~~ <u>the</u> first set; and

code for convolving ~~said~~ <u>the</u> kernel values with ~~said~~ <u>the</u> discrete sample values to provide a second set of discrete sample values.

21. (Currently Amended) The computer readable medium according to claim 20, wherein ~~said kernel is~~ the plurality of interpolation kernels are each derived from a universal interpolation kernel, *h(s)*.

22. (Currently Amended) The computer readable medium according to claim ~~21~~ 20, wherein ~~said universal interpolation kernel, *h(s)*, is of the form~~ the plurality of kernels are given by:

$$h(s_x, s_y)_{0 \le \theta \le \pi/2} = \frac{1}{\sqrt{2}} \left\{ h\big((1 - 2\theta/\pi)s_x + (2\theta/\pi)s_y\big)_{c=0.5} \cdot h\big(((2\theta/\pi)s_x + 2\theta/\pi - 1)s_y)w(\theta)\big)_{c=0} \right\}$$

$$h(s_x, s_y)_{\pi/2 \le \theta \le \pi} = \frac{1}{\sqrt{2}} \left\{ h\big((2\theta/\pi)s_x + (2\theta/\pi - 2)s_y\big)_{c=0.5} \cdot h\big(((2\theta/\pi)s_x(1 - 2\theta/\pi)s_y)w(\theta)\big)_{c=0} \right\}$$

and wherein *h(s)* is a universal interpolation kernel, $s_x = x/\Delta x$ and $s_y = y/\Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and • indicates matrix mulitplication

$$\cancel{h(s) =} \begin{cases} 1, & 0 \le |s| \le d \\ (2 - \frac{3}{2}b - c)\left|\frac{s-d}{1-2d}\right|^3 + (-3 + 2b + c)\left|\frac{s-d}{1-2d}\right|^2 + (1 - \frac{1}{3}b), & d < |s| \le 1 - d \\ \cancel{0, \quad 1 - d < |s| \le 1 + d} \\ (-\frac{1}{6}b - c)\left|\frac{s-3d}{1-2d}\right|^3 + (b + 5c)\left|\frac{s-3d}{1-2d}\right|^2 + (-2b - 8c)\left|\frac{s-3d}{1-2d}\right| + (\frac{4}{3}b + 4c), & 1 + d < |s| \le 2 - d \\ 0, & Otherwise \end{cases}$$

~~and wherein $s = t / \Delta t$ and $0 \le d < 0.5$~~.

23. (Currently Amended) The computer readable medium according to claim 20, wherein ~~said~~ the plurality of kernels are given by:

$$h(s) = \begin{cases} (2 - \frac{3}{2}b - c)|s|^3 + (-3 + 2b + c)|s|^2 + (1 - \frac{1}{3}b), & |s| \le 1 \\ (-\frac{1}{6}b - c)|s|^3 + (b + 5c)|s|^2 + (-2b - 8c)|s| + (\frac{4}{3}b + 4c), & 1 < |s| \le 2 \\ 0, & Otherwise \end{cases}$$

$$h(s) = \begin{cases} 1, -d < s \le d \\ 0, (1-d) \ge s > (1-d) \\ 2\left|\frac{s-d}{1-2d}\right|^3 - 3\left|\frac{s-d}{1-2d}\right|^2 + 1, \end{cases}$$

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$$h(s_x, s_y)_{\theta=0} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0.5} \cdot h(s_y)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=\pi/2} = \frac{1}{\sqrt{2}}\left\{h(s_x)_{c=0} \cdot h(s_y)_{c=0.5}\right.$$

$$h(s_x, s_y)_{\theta=\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{2}\right)_{c=0.5} \cdot h\left(\frac{s_x - s_y}{\sqrt{2}}\right)_{c=0}\right\}$$

$$h(s_x, s_y)_{\theta=3\pi/4} = \frac{1}{\sqrt{2}}\left\{h\left(\frac{s_x + s_y}{\sqrt{2}}\right)_{c=0} \cdot h\left(\frac{s_x - s_y}{2}\right)_{c=0.5}\right\},$$

and wherein <u>$h(s)$ is a modified cubic kernel,</u> $s_x = x / \Delta x$ and $s_y = y / \Delta y$ are re-sampling distances in the horizontal and vertical directions, respectively, and . indicates matrix multiplication.

24. (Currently Amended) The computer readable medium according to claim 20, wherein ~~said~~ the first set of discrete sample values are at a different resolution to ~~said~~ the second set of discrete sample values.

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